

**MAY/FY06**

**CORNHUSKER ARMY  
AMMUNITION PLANT  
Nebraska**

**Army Defense Environmental  
Restoration Program  
Installation Action Plan**

Final 26 June 2006

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## Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year Cleanup Program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern, and proposes a comprehensive, installation-wide approach, with associated costs and schedules, to conduct investigations, necessary remedial actions, and long term maintenance.

In an effort to coordinate planning information between the restoration manager, US Army Environmental Center (USAEC), Cornhusker Army Ammunition Plant, executing agencies, and regulatory agencies, an IAP was completed. The IAP is used to track requirements, schedules and tentative budgets for all Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

The following agencies contributed to the formulation and completion of this Installation Action Plan during a planning workshop held on 16 May 2006:

**Company/Installation/Branch**

URS Corp

EA Engineering

US Environmental Protection Agency (USEPA)

US Army Environmental Center/IERD

NPPD

US Army Environmental Center

Engineering and Environment, Inc. for USAEC

Nebraska Department of Environmental Quality (NDEQ)

URS Corp.

Cornhusker AAP Environmental Program Manager/On-site POC

Central Platte NRD

## Acronyms & Abbreviations

<b>5X</b>	clean to transfer
<b>AAP</b>	Army Ammunition Plant
<b>ABA</b>	Abandoned Burn Area
<b>AEC</b>	Army Environmental Center
<b>AEDB-R</b>	Army Environmental Database - Restoration (formerly DSERTS)
<b>ALF</b>	Abandoned Landfill
<b>ADRA</b>	Ammunition Demilitarization and Renovation Area
<b>ARAR</b>	Applicable or Relevant and Appropriate Requirement.
<b>AST</b>	Aboveground Storage Tank
<b>ATSDR</b>	Agency for Toxic Substances and Disease Registry
<b>BPA</b>	Burning Pit Area
<b>CAAP</b>	Cornhusker Army Ammunition Plant (changed to CHAAP)
<b>CERCLA</b>	Comprehensive Environmental Response Compensation and Liability Act
<b>CHAAP</b>	Cornhusker Army Ammunition Plant
<b>COE</b>	Corps of Engineers
<b>CPNRD</b>	Central Platte Natural Resources District
<b>CRS</b>	Cornhusker Railcar Services
<b>CTC</b>	Cost-to-Complete
<b>CY</b>	Calendar Year
<b>DCE</b>	Deputy Commanding Engineer
<b>DD</b>	Decision Document
<b>DDESB</b>	Department of Defense Explosive Safety Board
<b>DMA</b>	Demolition Area
<b>DMM</b>	Discarded Military Munitions
<b>DNT</b>	2,4 Dinitrotoluene
<b>DoD</b>	Department of Defense
<b>DSA</b>	Diesel Spill Area
<b>EB</b>	Explosive Building
<b>ENSR</b>	Environmental Contractor
<b>EPA</b>	Environmental Protection Agency
<b>ER,A</b>	Environmental Restoration, Army (formerly DERA)
<b>FFA</b>	Federal Facilities Agreement (same as IAG)
<b>FFSRA</b>	Federal Facility Site Remediation Agreement
<b>FRBB</b>	Firing Range Backstop Berm
<b>FS</b>	Feasibility Study
<b>FY</b>	Fiscal Year
<b>GAC</b>	Granular Activated Carbon
<b>gpm</b>	gallons per minute
<b>HMX</b>	Cycloteramethylenetrinitramine
<b>HRR</b>	Historical Record Review
<b>HRS</b>	Hazard Ranking Score
<b>IAG</b>	Interagency Agreement (same as FFA)
<b>IAP</b>	Installation Action Plan
<b>IOC</b>	Industrial Operations Command (now OSC)
<b>IRA</b>	Interim Remedial Action
<b>IRIP</b>	Installation Restoration Incineration Program

## Acronyms & Abbreviations

<b>IRP</b>	Installation Restoration Program
<b>K</b>	Thousand
<b>LAP</b>	Load, Assemble, and Pack
<b>LF</b>	Landfill
<b>LL</b>	Load Lines
<b>LTM</b>	Long-term Management
<b>LTO</b>	Long-term Operation
<b>M</b>	Million
<b>MC</b>	Munitions Constituents
<b>MCL</b>	Maximum Contaminant Level
<b>MEC</b>	Munitions and Explosives of Concern
<b>MMRP</b>	Military Munitions Response Program
<b>NB</b>	Nitrobenzene
<b>NDEQ</b>	Nebraska Department of Environmental Quality
<b>NE</b>	Not Evaluated/Nebraska
<b>NEB</b>	Non Explosive Building
<b>NFA</b>	No Further Action
<b>NPL</b>	National Priority List
<b>NRD</b>	Natural Resources District
<b>OB/OD</b>	Open Burn/Open Detonation
<b>OE</b>	Ordnance and Explosives
<b>O&amp;M</b>	Operation and Maintenance
<b>OPM</b>	Operational Periodic Monitoring (pre-RA)
<b>OSC</b>	Operations Support Command (replaced IOC)
<b>OU</b>	Operable Unit
<b>PA</b>	Preliminary Assessment
<b>PEB</b>	Potential Explosive Building
<b>POC</b>	Point of Contact
<b>POL</b>	Petroleum, Oil and Lubricants
<b>PP</b>	Proposed Plan
<b>ppb</b>	parts per billion
<b>ppm</b>	parts per million
<b>PRGS</b>	Preliminary Remediation Goals
<b>PY</b>	Prior Year
<b>RA</b>	Remedial Action
<b>RA(C)</b>	Remedial Action (Construction)
<b>RA(O)</b>	Remedial Action (Operation)
<b>RAB</b>	Restoration Advisory Board
<b>RACER</b>	Remedial Action and Cost Engineering Requirements
<b>RBCS</b>	Risk-based Concentrations
<b>RC</b>	Response Complete
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>RD</b>	Remedial Design
<b>RDX</b>	Cyclonite: Royal Demolition Explosives
<b>RI</b>	Remedial Investigation
<b>RIP</b>	Remedy in Place

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## Acronyms & Abbreviations

<b>ROD</b>	Record of Decision
<b>RRSE</b>	Relative Risk Site Evaluation
<b>SETS</b>	Static Ejection Test Site
<b>SI</b>	Site Investigation
<b>SL</b>	Sanitary Landfill
<b>SOC</b>	Statement of Condition
<b>S&amp;R</b>	Supervision and Review
<b>SVOC</b>	Semi-Volatile Organic Compounds
<b>TCA</b>	Trichloroethane
<b>TNB</b>	1,3,5 Trinitrobenzene
<b>TNT</b>	Trinitrotoluene
<b>TPH-DRO</b>	Total Petroleum Hydrocarbons - Diesel Range Organics
<b>TRC</b>	Technical Review Committee
<b>µg/g</b>	microgram per gram
<b>µg/l</b>	microgram per liter
<b>USACHPPM</b>	US Army Center for Health Promotion and Preventive Medicine
<b>USACE</b>	US Army Corps of Engineers
<b>USAEC</b>	US Army Environmental Center
<b>USAEHA</b>	US Army Environmental Hygiene Agency (replaced by USACHPPM)
<b>USATHAMA</b>	US Army Toxic and Hazardous Material Agency (replaced by USAEC)
<b>USEPA</b>	US Environmental Protection Agency
<b>UST</b>	Underground Storage Tank
<b>UXO</b>	Unexploded Ordnance
<b>VOC</b>	Volatile Organic Compound

**Installation Locale:** CHAAP is located approximately 2 miles west of Grand Island, NE, and presently consists of 3,000 acres of land awaiting restoration for public transfer and disposal to public buyers. The current working population at the facility is one civilian. The plant was operated intermittently over a period of over 30 years from 1942 to 1974 and has remained inactive since 1974 to date. The working population exceeded 5,000 personnel during past production activities. The facility maintenance contract was terminated in 1990 following the facility's addition to the property excess list. The area surrounding CHAAP is primarily rural with the city of Grand Island (population 44,000) two miles east.

**Installation Mission:** Currently, activities at CHAAP are restoration, cleanup and leasing of property for agriculture pending final disposal.

**Lead Organization:**

US Army Corps of Engineers, Omaha District

**Lead Executing Agencies:**

**Oversight:** US Army Corps of Engineers

**Action Phase:** US Army Corps of Engineers, Omaha District, POC Mr. Alvin Kam

**Regulatory Participation**

**Federal:** US Environmental Protection Agency, Region VII, Remedial Project Manager Mr. Bryant Burnett

**State:** Nebraska Department of Environmental Quality, Remediation Section, Project Manager Mr. Ed Southwick

**National Priorities List (NPL) Status:** NPL Effective Date: 22 Jul 87

- FFA 04 Sept 90
- TRC Started: 07 Nov 91
- OU1 ROD, 18 Nov 94
- OU-2 ROD Sep 1998
- Constructed Pump & Treatment Plant, OU-1 Dec 1998
- OU-3 ROD Dec 1999
- OU-4 ROD Feb 2000
- OU1 ROD Amendment Sep 2001
- Project removal from NPL: FY2012
- CERCLA Five Year Review completed

**Projected Dates for Construction Completion:** 2008

**Projected Date for NPL Removal:** FY2012

### ***Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation (TAPP) Status:***

There has been no public interest in forming a RAB at CHAAP. CHAAP, regulators and advisory members of Hall County Reuse Committee work together on decisions; the public has given their representation to the CPNRD for groundwater issues.

### ***Installation Program Summaries***

#### ***IRP***

Contaminants of Concern: Asbestos, Explosives, Metals, Trichloroethane (TCA), Volatile Organic Compounds (VOC)

Media of Concern: Groundwater, Soil

Estimated date for RIP/RC: 1998/2027

Funding to date (up to FY05): \$56,082K

Current year funding (FY06): \$2,886K

Cost-to-Complete (FY07+): \$18,735K

#### ***MMRP***

Primary Contaminants of Concern: Metals, MC, Explosives, Gravel Mines

Affected Media of Concern: Soil, Groundwater

Estimated Date for RC: 2013

Funding to Date (up to FY05): \$44K

Current Year Funding (FY06): \$200K

Cost-to-Complete (FY07+): \$8,293K



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## Cleanup Program Summary

### ***Installation Historic Activity***

CHAAP was constructed for the production of artillery, bombs, boosters and supplementary charges for World War II. The plant was operated intermittently over a period of 30 years, being activated for munitions production from 1942 to 1945 (World War II), 1950 to 1957 (Korean Conflict) and 1965 to 1973 (Vietnam Conflict). In addition, between 1945 and 1948, the ammonium nitrate area, formerly used for nitrates production, was used for the production of fertilizer. The most recent operations terminated in 1974. Land disposal began in 1999.

Current activities at the facility reflect declining industrial and agricultural lease base. The local community formed a Reuse Committee to guide the excessing of the facility, in accordance with the 1994 public law requiring the Hall County Reuse Committee to direct prioritization to the Army to excess the facility in accordance with the "Comprehensive Reuse Plan for the Cornhusker Army Ammunition Plant," dated 30 December 97. Approximately 25% of CHAAP remains for sale to designees.

The installation was listed on the National Priorities List (NPL) on 22 July 1987 due to the waste disposal procedures to the load-line cesspools and leach pits and from the disposal of waste. CHAAP was placed on the NPL with a Hazard Ranking Score of 51.13. A Federal Facility Agreement (FFA) was signed by the US Environmental Protection Agency (EPA) Region VII, the Nebraska Department of Environmental Quality (NDEQ) and the Army, effective 4 September 1990.

### ***PROGRAM PROGRESS:***

#### ***IRP***

- Prior Year Progress: Continued RA(O) at OU1. Negotiated a performance-based LTM contract. Awarded a contract for the chemical characterization of asbestos contaminated debris pits and residual explosives contaminated soils beneath former concrete floor slabs and ramps in Load Lines 1, 2 & 3 to be completed in 2006. LTO/LTM continued RA(O) over the groundwater plume.
- Future Plan of Action: Contract for the chemical characterization of residual explosives contaminated soils beneath former concrete floor slabs and ramps in Load Line 4 in 2007. Submit ESS for approval for NFA in order to transfer land to the public.

#### ***MMRP***

- Prior Year Progress: The PA for the one MMRP site identified at CHAAP was completed in May 2005.
- Future Plan of Action: A Site Investigation is currently underway and is scheduled for completion in September 2009 for OU5. Follow on phases/actions will be executed as required in the individual site cleanup strategies.

# CORNHUSKER ARMY AMMUNITION PLANT

## Installation Restoration Program

**Total AEDB-R IRP Sites/AEDB-R sites with Response Complete:** 66/63

***Different Site Types:***

- 2 Above Ground Storage Tanks
- 1 Burn Area
- 1 Contaminated Ground Water
- 59 Disposal Pits/Dry Wells
- 1 Landfill
- 2 Waste Treatment Plants

***Most Widespread Contaminants of Concern:*** Asbestos, Explosives, Metals, Trichloroethane (TCA), Volatile Organic Compounds (VOC)

***Media of Concern:*** Groundwater, Soil

***Completed Removal (REM)/Interim Remedial Action (IRA)/Remedial Action (RA):***

- Waterline extension (Dec 86 & 94), \$8,000
- Soils incineration (Aug 88), \$10,500
- Hotspot Removal (Jun 94), \$1,200
- •OU1 Groundwater Treatment Plant (Dec 98), \$9,000

***Total IRP Funding***

Prior years (up to FY05):	\$56,082K
Current year funding (FY06):	\$ 2,886K
Future Requirements (FY07+):	\$18,735K
Total:	\$77,703K

***Duration of IRP***

Year of IRP Inception: 1980  
Year of IRP RIP/RC: 1998/2023  
Year of IRP Completion including Long-Term Management (LTM): 2023

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## IRP Contamination Assessment

In March 1980, an installation assessment of CHAAP was completed by the US Army Toxic and Hazardous Materials Agency (USATHAMA). Based on the findings of that report, subsequent investigations confirmed the presence of munitions contamination and migration of contaminants. Subsequent investigations confirmed the presence of munitions contamination in soils and groundwater. A residential well survey was conducted to assure that all potential residential wells exposed to RDX were sampled. A portion of the alluvial aquifer extending northeast of Load Line 1 from the boundary of CHAAP into the northwest portion of Grand Island (Capital Heights area) has been contaminated with explosive compounds. Recent and historical sampling results indicate that RDX has migrated the greatest distance within the aquifer. The presence of RDX in the alluvial aquifer has been verified approximately 4 miles east of the CHAAP boundary. Sampling for HMX has indicated that small concentrations of this analyte also occur in the Capital Heights area.

As a result of this groundwater contamination, the US Army paid for installation of a permanent water supply for residences in the area based on a drinking water criteria for RDX of 35 parts per billion (ppb). The presence of explosive compounds detected in off-post domestic water supply wells at levels above suggested water quality criteria levels required, an alternative water supply was provided to effected residences. The Army supplied bottled water to residents from January 1984 through June 1986, until a permanent alternative water supply system could be constructed. An extension of the city water system to the effected area began in August 1984. Due to a shallow water table, a system of dewatering wells was used to lower the water table sufficiently to allow installation of the water mains. The contaminated groundwater from the dewatering wells was discharged into Silver Creek, north of the residential area. Construction was completed in phases, with residential hookups completed in December 1986. Approximately 800 residences, including the affected area and adjacent neighborhoods that could be affected in the future, were provided an opportunity to hook up to the Northwest Grand Island Water Supply Extension.

Contaminated soils were removed and incinerated from September 1986 to August 1988. Contaminated groundwater has migrated beneath the Capital Heights area of Grand Island, Nebraska, contaminating approximately 246 drinking water sources in residences there. The installation was listed on the National Priorities List (NPL) on 22 July 87 due to the groundwater contamination emanating from the load-line cesspools and leach pits. CHAAP was placed on the NPL with a Hazard Ranking Score of 51.13.

A Federal Facility Agreement (FFA) was signed by the US Environmental Protection Agency (EPA) Region VII, the Nebraska Department of Environmental Quality (NDEQ) and the Army, effective 4 September 90. The FFA included all response actions, including removal and remedial actions as the terms were defined by CERCLA, to be undertaken at CHAAP.

A Remedial Investigation and Feasibility Study (RI/FS) task for all seven study areas (the load line sites) was awarded in December 91. The scope of the contract carried the

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## IRP Contamination Assessment

Operable Unit 1 (OU1) through the interim Record of Decision (ROD). The ROD for the explosive plume was signed by EPA Region VII on 29 September 94 and by the Army on 18 November 94. The Nebraska DEQ concurred on 2 December 94 to the Interim ROD. The design contract for the interim action ROD was awarded in March 94.

After the installation of the waterline extension, the US Army and the US Environmental Protection Agency's Office of Drinking Water published a health advisory which recommended that the drinking water criteria for general population be established at 10 ppb for ingestion only and 2 ppb for multiple pathways. Based upon this recommendation, the US Army, in agreement with the Nebraska Department of Health, sampled additional residential wells near the area of concern using the 2 ppb health advisory as the decision point for alternative water implementation. These residents were provided bottled water as an interim action and all effected residents have been provided with the opportunity to access city water. A second waterline extension was constructed in December 1993. The maintenance of the waterline was transferred to the city. This extension covers the area east of the furthest detection of explosives.

The proposed design included extraction of 750 gpm in the source areas on-post, 150 gpm at the 20 ppb isopleth near Capital Heights, and 800 gpm at the distal end of the plume to prevent further migration of the RDX plume to the east. The Explanation of Significant Difference (ESD) implemented work on-post for the primary source areas and discharge to on-post canals. The explosives-contaminated water is pumped through a granular activated carbon system and discharged to on-post canals. Award of construction contract for the on-post phase was 13 June 97. Official OU1 groundwater treatment plant operation and maintenance began 18 December 98. The amended ROD for OU1 was signed in September 2001 to better define 'institutional controls' (the city has enacted an ordinance to deny domestic well installation).

In addition, the waterline extension was completed in 1995 with service provided to 50 additional residents in the affected area. The removal of approximately 5000 tons of explosives-contaminated soils was completed in December 94. Confirmation of the removal was completed during the spring of 1995. A contract was awarded in July 94 to fill data gaps and complete the remaining remedial investigation and feasibility study (RI/FS). This contract completed the final RI for the facility for bringing the entire site to a final ROD and exceeding CHAAP. In addition, a Preliminary Assessment Screening Report and Statement of Condition was completed in FY95 for a portion of the Phase I property planned for excessing. The final RI was completed in November 96. The final FS was approved February 98 and the final ROD (no further action) for OU2 was completed in September 98. The OU3 ROD was signed in December 99 and the OU4 ROD was signed in February 2000. Remedial action for the removal of explosives- and lead-contaminated soil was completed in 2000.

Previous investigations will serve to support excessing actions for the preparation of the Statement of Condition (SOC) of CHAAP and plans to parcel/excess properties. The Hall County Reuse Committee determines prioritization of properties for disposal. The reuse plan was completed in December 97.

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## IRP Contamination Assessment

Projected Construction Completion and Deletion from NPL: OU1 pump and treatment plant was completed in December 98. Removal from the NPL list will be initiated in FY2012.

These operable units are as follows:

- Operable Unit 1: LAP groundwater plume (primarily TNT and RDX).
- Operable Unit 2: No further action; Administration Base Housing Area, Abandoned Burning Ground, Magazine Areas, Drainage Ditches and Miscellaneous Storage Areas
- Operable Unit 3: Nitrate Area, Pistol Range, Shop Area, Sanitary Landfill (explosives, VOCs, and metals). No further action
- Operable Unit 4: LAP Facility soils, sediments and surface water. All other areas of concern are under institutional control; remedy in place therefore no further action.
- Operable Unit 5: Burning and Demo Grounds (explosives and metals)

### ***IRP Cleanup Exit Strategy***

Perform RA(O) until contamination in groundwater meets ROD requirements. Implement groundwater amendments in 2007-2009 to the contaminant sources and peripheral areas in the direction of the groundwater flow and continue LTM requirements until 2020. The entire explosive plume on site could be remediated prior to 2018 followed by the groundwater processing plant decommissioned in 2020. Off site LTM will continue to be performed under MNA until 2 years after ROD requirements are met.

### 1990

- Fact Sheet, RDX Health Effects, USATHAMA, March
- Federal Facility Agreement, EPA, NDEQ, and DA, April

### 1991

- Community Interviews, USATHAMA, January
- EPA Region VII Facts Sheet, CAAP, November
- Community Relations Plan, USATHAMA, November
- Data Management Plan, USATHAMA, November
- Sampling & Analysis Plan- Field Sampling Work Plan, USATHAMA, November
- Facts Sheets, Vegetable Gardens, Grand Island, NE, USATHAMA & ENSR, November

### 1992

- Facts Sheet, CAAP Summary of IAG, AEC, January
- Remedial Investigation/Feasibility Study, AEC, June
- Engineering Evaluation/Cost Analysis, AEC, July
- Public Health Assessments for Cornhusker AAP, ATSDR, August
- Assessment of Chemical ARARs & Pump Test, USATHAMA, October
- Site Characterization report, AEC, Stollar. December

### 1993

- Facts Sheet, Flooded Basements & RDX, AEC & Watkins-Johnson Inc., May
- Plant Site Characterization Report, AEC & Watkins-Johnson Inc., June
- Initial Screening of Technologies, AEC & Watkins-Johnson Inc., July

### 1994

- Focused Feasibility Study for Groundwater Operable Unit One, AEC & Watkins-Johnson Inc., March
- Proposed Plan CAAP, Operable Unit One Explosives Groundwater Plume, AEC, May
- Public Availability Session - Groundwater Cleanup, CAAP, May
- Groundwater Modeling, Watkins-Johnson Inc., September
- Record of Decision (ROD) Summary, Operable Unit One, AEC, September
- Work Plan OU1 Groundwater, RUST Corporation, November
- Background Data review & Evaluation, ICF Kaiser Inc., December

### 1995

- RD/RA Predesign Technical Summary OU1 Groundwater, RUST Corporation, February
- Preliminary Assessment Screening (PAS) of Agricultural Tracts 41, 42, 44, 53, 54, 55, 56 & 57, AEC, May
- Technical Plan, Part A & B RI/FS, ICF Kaiser Inc., June
- Quality Assurance Project Plan, ICF Kaiser Inc., June
- Concept Design Analysis, OU-1, RUST Corporation, August
- Report, Groundwater Interim remedial Action Design-Basis Model, Dames & Moore Inc., September



### 1996

- Document: Explanation of Significant Differences (ESD) AEC Change in Effluent Water Discharge Location, AEC, May
- Report, AEC/ICF Kaiser Remedial Investigation/Feasibility Study RI/FS of Tanks UST/AST, ICF Kaiser Inc., May
- Symptom & Disease Prevalence-Health Study- Final Report, ATSDR, September
- Remedial Investigation Report CHAAP, US AEC Final Chapters, ICF Kaiser Inc., September
- OU2 Remedial Investigation Addendum, Final Document "No Further Action", AEC, November

### 1997

- Proposed Plan (Final) No Further Action OU2 (Administration Area, Magazines, Housing, Miscellaneous Storage, Abandoned Burning Grounds, Drainage Ditches), AEC, February
- Explanation of Significant Differences (ESD) & Related Public Meeting Documents for OU1 Record of Decision (ROD), AEC & EPA, February
- Proposed Plan - OU2 Public Meeting includes Restoration Advisory Board (RAB) Briefing, AEC, March
- Feasibility Study - Operable Unit One (Unsaturated Zone) and Operable Unit Three, Final Document, AEC, May
- Environmental Assessment / FONSI, OU1 Groundwater Treatment Plant, COE, Omaha District, July
- 1996 Annual Sampling LTM Program, URS Woodward Clyde, July
- Underground / Above Ground Storage Tanks, UST / AST site Investigation, Final, AEC, October

### 1998

- Proposed Plan- OU3 and OU4 Public Meeting, USACE, February
- 1997 Annual Sampling LTM Program, URS Woodward Clyde, March
- OU2, ROD, ICF Kaiser Inc., September
- June 1998 Annual Sampling Event for Long-term Monitoring Program, Woodward Clyde, October
- EBS, USACHPPM, November

### 1999

- Groundwater Flow Modeling, URS Woodward Clyde, May
- 1999 Annual Sampling Event for LTM Program, URS Woodward Clyde, July
- OU3 ROD, ICF Kaiser Inc., December

### 2000

- OU4 ROD, ICF Kaiser Inc., February
- Final Groundwater Flow & Contaminant Fate & Transport Modeling, URS Woodward Clyde, March
- Draft Report March 2000 Annual Sampling Event for Long-term Monitoring, URS Woodward Clyde, July
- OU3 and OU5 LTM Report, HydroGeologic Inc., September



### 2000 (cont.)

- Final Report March 2000 Annual Sampling Event for Long-term Monitoring, URS Woodward Clyde, September
- OU3 final Soils Report, CET, December
- Final Report First Annual GW Sampling for OPM for Burning Ground and Shop Area, HydroGeologic, December

### 2001

- Revised PP for OU1 ROD Amendment, URS Woodward Clyde, February
- Annual Sampling LTM March 01, URS Woodward Clyde, June

### 2003

- Final Workplan for OU1 ROD Amendment, USACE, January
- Demonstration of Operating Properly & Successfully for Explosive Soil Remediation Actions in the Load Lines in OU4 & No Further Action/No Response Action in OU2 & GWTP, LTM & Off site Natural Attenuation of Contaminated Explosive Plume in OU1, USACE, February
- Groundwater Sampling Event Technical Plan Letter Addendum, HydroGeologic & URS, Inc., February
- Groundwater Sampling Event Technical Plan Letter Addendum, HydroGeologic/URS, Inc., February
- Letter CHAAP Review of Quality Assurance Project Plan For Remediation of Lead Impacted Soil at the Pistol Range Static Ejection Site/Backstop Berm, NDEQ, May
- Scope of Work for Contaminated Soil Removal, Cornhusker Army Ammunition Plant, Deerwater Environmental Management Services, May
- Draft Annual Sampling Event for LTM, HydroGeologic, June
- Closed, Transferring & Transferred/Site Inventory Report, Engineering Environmental Management Inc./USACE, July
- Draft CERCLA Review, HydroGeologic, September
- Final March 03 Annual Sampling Event for LTM, HydroGeologic, September
- Draft Project Work Plan, Contaminated Soil Removal, Cornhusker Army Ammunition Plant, Deerwater Environmental Management Services, October
- 2003 Monitoring Well Maintenance, Cornhusker Army Ammunition Plant, HydroGeologic, Inc., October
- Environmental Security Testing and Certification Program (ESTCP) Design and Installation Plan, Oregon Health & Science University of Oregon, November
- Draft Report Contaminated Soil Removal CHAAP, Deerwater Environmental Management Services, December

### 2004

- Final Contaminated Soil Removal OU3, Cornhusker AAP, Deerwater Environmental Management Services, March
- CHAAP Feb 2004 Monitoring Well Installation Trip Report, HydroGeologic, Inc., March
- Final First Five Year (CERCLA) Review, HydroGeologic, Inc., March
- Draft LTM Optimization Study for CHAAP, HydroGeologic, Inc., May
- Draft Groundwater Model Review, CHAAP, HydroGeologic, Inc., May

### 2004 (cont.)

- Draft March 2004 Annual Sampling Event for the LTM Program, HydroGeologic, Inc., July
- ESTCP Demonstration Project Summary – Oregon Health and Science, University of Oregon, July
- Quality Assurance Project Summary for Remediation of Lead Impacted Soil at CHAAP Pistol Range Static Ejection Site/Backstop Berm, Jacobsen/Helgoth Consultants, December
- March 2004 Groundwater Sampling Event Draft Technical Plan Addendum, Cornhusker AAP, HydroGeologic, Inc., February 4
- January 2003 – December 2003 Groundwater Treatment System Sampling & Analysis CHAAP (Chemical Quality Control Summary Report), HydroGeologic, Inc., February 4
- Final OU1 Amendment
- Long-term Operations (LTO) Groundwater Treatment Facility at OU1 and Long-term Monitoring (LTM) at OU1, OU3, & OU5, Corps of Engineers, May 7
- Final LTM Optimization Study, HydroGeologic, Inc., July
- Final March 2004 Annual Sampling Event for LTM Program, HydroGeologic, Inc., September

### 2005

- Draft Estimation of Minimum Distance for Groundwater Extraction Wells and Groundwater Flow Model Update, HydroGeologic, Inc., January
- Final Estimation of Minimum Distance for Groundwater Extraction Wells and Groundwater Flow Model Update, HydroGeologic, Inc., February
- March 05 Groundwater Sampling Event Technical Plan Letter Addendum, EA/URS, February 14
- Chemical Quality Control Summary Report Jan 04 - Dec 04 Groundwater Treatment System Sampling Analysis, HydroGeologic, Inc., March
- Long-Term Monitoring in Support of Natural Attenuation - March 05 Results, CHAAP, EA/URS, March
- Draft March 2005 Annual Sampling Event for LTM Program, EA/URS, June
- Scope of Work for Chemical Characterization for Load Line 1 & 2, CHAAP, USACE, 10 August
- Burning Grounds Groundwater Sampling Event Draft Technical Plan Letter Addendum, CHAAP, URS, 11 October
- November 2005 Monitoring Well Abandonment Letter Report Long-Term Monitoring Program, CHAAP, URS, 8 Dec

### 2006

- Draft Nov/Dec 05 Burning Ground Areas Groundwater Sampling Event, CHAAP, URS, Jan
- March 06 Long-Term Monitoring Groundwater Sampling Event Technical Plan Letter Addendum, CHAAP, URS, 24 Jan
- Chemical Quality Control Summary Report, Jan 05-Dec 05 Groundwater Treatment Sampling and Analysis, EA, February
- Final Facility-Wide Work Plan, CHAAP, URS, April

### **2006 (cont.)**

- Final Work Plan Addendum - Explosives-Contaminated Soil Investigation and Removal at Load Lines 1 through 4, CHAAP, URS, April
- Site Inspection Report, CHAAP, USACE, April
- Draft Work Plan Addendum Asbestos-Contaminated Material Removal at Load Lines 1 & 2, CHAAP, URS, May

### ***REPORTS FROM MKM Engineers, Inc.***

#### **1999**

- Closure Report for Site Investigation and Screening of Unexploded Ordnance at OB/OD Area, May

#### **2000**

- Demolition of Load Line #5 at Cornhusker Army Ammunition Plant, December

#### **2001**

- Workplan Disassembly and Decontamination of Select Process Equipment at Load Lines 1, 2, 3 and 4, July

#### **2002**

- 5X Certification of Load Lines 1 through 5 at Cornhusker Army Ammunition Plant, May

#### **2003**

- Scope of Work, Thermal Decomposition and 5X Certification of Load Line #3, September
- Proposal for Thermal Decomposition, Demolition and 5X Certification of Load Line #4, September
- Scope of Work for Thermal Decomposition, Demolition and 5X Certification of Select Buildings in Nitrate and Shop Areas, September
- 5X Certification of Load Line #5, December

#### **2004**

- Thermal Decomposition and Demolition of Load Line #3, October
- Final Report - Thermal Decomposition, Demolition and Certification of Nitrate Area and Selected Buildings in Shop Area
- Thermal Decomposition, Demolition and 5X Certification of Load Line #1 - Vol 1-5, December

### ***Administrative Record - Unexploded Ordnance/DMM***

#### **2005**

- Work Plan - Geophysical Survey and Anomaly Investigation and Removal of Industrial And Sewers, Testing Water Supply Lines and Limited Soil Screening for Explosives in Load Lines 3 And 4, PIKE International, January

### 2005 (cont.)

- Work Plan for Geophysical Investigation and Site Survey of the Pistol Range and the New OB/OD Grounds, Lakeshore Engineering, January
- Closeout Report for Geophysical Investigation And Site Survey of the Pistol Range and The OB/OD Grounds, Lakeshore Engineering, February
- Site Activities Work Plan for Asbestos Abatement Building Demolition, Creosote Wood Removal and Fence Installation, Lakeshore Engineering, February
- Geophysical Prove Out Report - Geophysical Survey and Anomaly Investigation and Removal of Industrial and Sewers, Testing of Water Supply Lines and Limited Soil Screening for Explosives in Load Lines 3 And 4, PIKA International, February
- Thermal Decomposition, Demolition and 5X Certification of Load Line #2-3 Volumes, PIKA International, March
- Workplan Asbestos Abatement at Load Line #4, PIKA International, April
- Closeout Report, Asbestos Abatement, Building Demolition, Creosote Wood Removal and Fence Installation, Lakeshore Engineering, July
- Disassembly, Decontamination and Demolition of Buildings and Installed Equipment Containing Explosives Residues at Load Line 4, CHAAP, PIKA International, July
- Geophysical Survey and Anomaly Investigation, Removal of Industrial and Sanitary Sewers, Testing of Water Supply Lines and Limited Soil Screening for Explosives in Load Lines 3 & 4, CHAAP, Volumes I, II, III, PIKA International, October

### 2006

- Asbestos Abatement at Load Line #4 and Asbestos Sewer Removal at Load Lines 1, 2, 3, CHAAP, PIKA International, Feb

# CORNHUSKER ARMY AMMUNITION PLANT

## Installation Restoration Program Site Descriptions

## **ER,A ELIGIBLE ACTIVE AEDB-R SITES**

### **OU1**

Operable Unit One (OU1) is comprised of the explosives-contaminated groundwater plume, which originates from the explosive production buildings on Load Lines 1-5. A ROD and a ROD Amendment have been completed for OU1 and a pump-and-treat system is currently on-line. The pump-and-treat system consists of seven extraction wells (four operational) with a total groundwater extraction rate of approximately 750 gallons per minute, sand filters and a granular activated carbon (GAC) adsorption system. LTM is performed on-site/off-site (MNA) and consists of a total of 119 monitoring wells and piezometers.

## OU1 GROUNDWATER (PAGE 1 OF 2)

**SITE DESCRIPTION**

The 5 Load Assemble and Pack (LAP) facilities at CHAAP constitute the major set of buildings and center for operations at the site during munitions production years. Munitions production within the load lines at CHAAP required use and disposal of large amounts of water. Major operations where explosives waste-water was produced included: screening, melting and mixing, rod and pellet manufacturing, remelt and refill, and washing and laundry.

Physical screening operations were conducted as the first process for incorporating explosives (i.e., 2,4,6-TNT and RDX) into munitions. Explosives were received in flake form and screened and sifted for material handling purposes. Waste-water was generated in the operation by the ventilation systems which collected explosive dust generated by the screening operation and washed it from the air with Schneible units (wet scrubbers). The water from the Schneible units was run through settling tanks and recycled; however, excess waste-water was produced.

Waste-water was also generated from periodic wash-down of machinery and interior building surfaces. The waste-water was disposed via interior building drains into a sack sump (concrete pit) that was equipped with a filter bag. The bag, made of canvas-like material, was designed to filter out the solid explosive particles. The waste-water was then transferred via open concrete channels into a circular earthen impoundment. The impoundment wall is masonry-lined with the bottom open to the sand and gravel strata. An overflow channel was routed from the impoundment to a leaching pit that was designed to handle any water that did not infiltrate into the bottom of the impoundment. This overflow occurred due to the limited filtering capacity of the sack sump to trap explosive particulates. Particles were periodically scraped from the bottom of both the earthen impoundments and leaching pits and ignited at the Burning Grounds (CAAP-005, OU5) located in the northwest section of CHAAP.

During the Installation Restoration Incineration Program (IRIP) (1988), it was determined that 58 impoundments had received explosives-contaminated wastewater. It was determined that soil would be removed from the impoundments if concentrations were greater than 5 parts per million (ppm) for 2,4,6-TNT, 10 ppm for RDX, 15 ppm for 1,3,5-TNB, 0.5 ppm for 2,4-DNT. Several guidelines, originally incorporated into the proposed excavation plan, related to the distance between the water table and the impoundments bottom and the location of adjacent building foundations.

**STATUS**

**REGULATORY DRIVER:**  
CERCLA, Federal Facility  
Agreement (NPL Installations)

**RRSE:** High

**CONTAMINANTS OF CONCERN:**  
Explosives

**MEDIA OF CONCERN:**  
Groundwater

Phases	Start	End
PA.....	197901 .....	198003
SI.....	197904 .....	198410
RI/FS .....	199101 .....	199405
RD .....	199405 .....	199704
IRA .....	198404 .....	199503
RA(C).....	199706 .....	199811
RA(O) .....	199812 .....	201712

**RIP: 199812**  
**RC: 201712**

## CAAP-010

# OU1 GROUNDWATER (PAGE 2 OF 2)

Soil would be removed from the bottoms of the impoundments until action levels were met (a depth of 6 ft) or the excavations had reached a depth 1 ft below the groundwater level, whichever occurred first. Additional guidelines specified that soil would be removed laterally until the action levels were met, or until building foundations were threatened by operations. Due to the high water table conditions at the time of the scheduled excavations, the criteria regarding the depth of the soil removal were changed to require meeting action levels or until soil had been removed to a depth of 5 ft below the water-table surface, whichever occurred first. Soil was removed in 29 of the 58 impoundments in spring 1988 to the point where action levels were met. In the other 29 impoundments, soil was removed to 5 ft below the water table. In these impoundments, concentrations of one or more of the explosive compounds were still above action levels. Action levels were achieved in all but two instances in the lateral direction.

In the fall of 1990, surface soil samples were collected by ICF Kaiser Engineers. Analytical results showed high concentrations of 2,4,6-TNT (3,200 µg/g and 6,000 µg/g) and elevated concentrations of lead (175 µg/g) and chromium (58.5 µg/g) in samples collected near Building 1L-10 in Load Line 1. Elevated concentrations of chromium (25.1 µg/g) and lead (135 µg/g) occurred in a sample taken southwest of the Building 1L-18 along the railroad tracks at the north end of this load line (Figure 2.2-8) RDX, NB, HMX and 1,3,5-TNB were detected at concentrations below 100 micrograms per gram (µg/g) but above Certified Reporting Limits (CRLs) in several other samples. Phase I RI: Twenty sites with surface soil containing 2,4,6-TNT at concentrations greater than 5 µg/g were identified in the LAP area based on field screening analytical results. The lateral extent of these "hot spots" range from approximately 40 to 380 ft. Three of the remaining cesspools have 2,4,6-TNT level contamination above 5 µg/g. Results also indicate that four non-explosive wastewater cesspools contained Cr and Pb above levels of concern. Isolated areas of petroleum hydrocarbons were detected ranging from 40 to 7,000 µg/g. Soil removal and off-site treatment of 5,000 tons of soil from 25 removal areas was carried out by the Army in 1994.

Phase II RI: Confirmation of the FY94 removal action was completed in June FY96. A more detailed background data collection was conducted to determine the elevation of metals in the LAP soils. In addition, work was carried out to determine the potential of contamination beneath the LAP structures. Samples from the Nov 96 RI have shown minimal amount of contamination below the LAP structures and indicated complete removal of explosives from the soil in all but IRA site 4 at Load Line 1 (1,400 µg/g).

The ROD Amendment was signed in September 2001. Funds other than ER,A were designated for explosive safety action to flash/restore/obtain 5X certification of the load lines for public development, have been completed. RA(O) phase began in 1998.

### CLEANUP STRATEGY

Continue to perform RA(O), which includes the monitoring and application of groundwater amendments to accelerate the removal of explosive contaminants.



## **ER,A ELIGIBLE ACTIVE AEDB-R SITES**

### **OU2**

Operable Unit Two (OU2) is comprised of the Administration and Base Housing Areas, Abandoned Burning Area, Drainage Ditches, Magazine Areas, Miscellaneous Storage Areas, and Sewage Treatment Plants. A ROD for institutional controls has been completed for OU2 (1998) because there is no indication of adverse effects from contact with environmental media at this operable unit.

## **ER,A ELIGIBLE ACTIVE AEDB-R SITES**

### **OU3**

Operable Unit Three (OU3) is comprised of Non-Active Demolition Debris Landfill (CAAP-003), and Motor Pool/Shop Area (CAAP-008). The Nitrate Area that exists in this OU is part of the Motor Pool in AEDB-R. This OU includes the Pistol Range. The OU3 ROD and remedial action was completed in August 2000 except for the Pistol Range backstop (active site not eligible for IRP funds), remediation completed in fall of 2003 by the city of Grand Island, NE per Real Estate leasing license agreement.

Remaining LTM (soils) consist of environmental compliance for contaminants of concern following 5X certification of the thermal decontamination of the LAP facilities and other miscellaneous sites.

# NON ACTIVE DEMOLITION DEBRIS LF (OU3)

## SITE DESCRIPTION

This site has been reopened due to change of site conditions, e.g., building demolition and slab removal to meet explosive safety requirements.

Characterization is required to ensure environmental conditions have not changed.

Reference site history of Load Lines 1, 2, 3 and 4. Post explosive safety removal actions uncovered asbestos debris pits. Removal of concrete slabs/ramps revealed explosive concentration exceeding 10%, which were reduced to comply with the DDESB certification and 5X certification for public disposal. The explosives contaminants left in place exceed PRGS and require remediation.

Misc. Sites: MEC/OE sub-sites in Tracts 19 (fuze destruction area), Tract 20 (fuze destruction area and ammonium nitrate burning ground) and Tract 21 (OB/OD).

## CLEANUP STRATEGY

Load Lines: Excavate/dispose of asbestos containing material discovered during geophysical survey as DMM anomalies and certify 5X for public disposal. Complete soil chemical characterization and removal of explosive-contaminated soils.

Misc. Sites: ESS for Tract 19 (fuze destruction area), Tract 20 (fuze destruction area and ammonium nitrate area), Tract 21 (static ejection test area).

1. Tract 21 (decant station), groundwater in situ treatment of a localized explosives-contaminated groundwater plume.
2. Tract 21 (Pistol Range - multiple sites) Freon SI and submittal of ESS for NFA.
3. Load Line #4 explosives contaminated soil.

## STATUS

### REGULATORY DRIVER:

CERCLA, Federal Facility Agreement (NPL Installations)

**RRSE:** High

### CONTAMINANTS OF CONCERN:

Explosives, Asbestos

**MEDIA OF CONCERN:** Soil, Groundwater

Phases	Start	End
PA .....	197904 .....	198003
SI .....	197904 .....	199106
RI/FS .....	199104 .....	199801
RD .....	199904 .....	199912
RA(C) .....	200001 .....	200106
<b>LTM .....</b>	<b>200508 .....</b>	<b>200809</b>

**RC: 200106**

# CAAP-008 MOTOR POOL (OU3)

## SITE DESCRIPTION

This site is made up of the Motor Pool Area (now a no further action site) and the Shop which are in completely separate locations.

**SHOP AREA:** The Shop Area is located in the southeast portion of the facility, south of Load Line 1, covering an area of about 1,500 ft x 2,000 ft and includes 28 buildings and sheds. The Shop Area consists of the vehicle, equipment and other operations maintenance facilities; rail loading and unloading area; and areas used for open storage. Operations in the Shop Area center around maintenance support for the entire CHAAP facility and involve the use and storage of various solvents. A TCA plume is on the west side of the area.

Note: For "Nitrate Area," see NFA Section.

## CLEANUP STRATEGY

The OU3 ROD for NFA proposed monitored natural attenuation (MNA). The state requires monitoring to continue until action levels are achieved. Monitoring for CAAP-008 will be conducted under this site.

## STATUS

**REGULATORY DRIVER:**  
CERCLA, Federal Facility  
Agreement (NPL Installations)

**RRSE:** Low

**CONTAMINANTS OF CONCERN:**  
TCA

**MEDIA OF CONCERN:**  
Groundwater

Phases	Start	End
PA .....	197904 .....	198003
SI .....	197904 .....	198409
RI/FS .....	198410 .....	200109
IRA .....	200003 .....	200009
LTM .....	200110 .....	202310

**RC: 200109**

## **ER,A ELIGIBLE ACTIVE AEDB-R SITES**

### **OU4**

Operable Unit Four (OU4) is comprised of Pink Water Disposal Pits (CAAP-001, CAAP-002), Clay Pit Disposal Area and the unsaturated zone (0 - 6 feet below ground surface) of Load Lines 1 through 5. Explosive Safety Actions (non-ER,A) conducted for transfer of Load Lines 1 through 5 to the general public is complete pending final 5X certification. Cleanup of Load Line is complete. Removal of sewer lines remain at Load Lines 1, 2 and 3 for final 5X certification. Explosive soil cleanup for Load Line 4 is scheduled for completion in CY07.

Chemical characterization of MEC/OE remaining consists of removal of asbestos debris pits (3) in Load Lines 1 & 2, and explosives-contaminated soils beneath former concrete slabs/ramps in Load Lines 1 through 4.

# CAAP-001/002

## LOAD LINES 1-5 (OU4)

### EXPLOSIVE SAFETY ACTIONS (NON ER,A) CONDUCTED FOR TRANSFER OF LOAD LINES 1 - 5 TO THE GENERAL PUBLIC.

DOD Policy and Guidance: DOD has documents outlining guidance and reference publications on explosive materials. Work is performed in accordance with “The Classification and Remediation of Explosive Contamination IOCP 385-1” issued by the US Army Operations Support Command in Rock Island, IL.

The Army has determined that controlled burning is the safest method for explosive decontamination.

**Rational for controlled burning as the safest option:** To decontaminate explosive contamination to include chemical attenuation and physical removal is technically impractical.

- a. Not subject technicians to direct contact with an unknown explosive environment that could result in a fatality.
- b. Conventional demolition and decontamination methods cause heat, shock, and friction, all of which trigger explosions.
- c. Complies with the Army’s objective of obtaining a 5X certification for public safety and transfer of property to private/public ownership.

### 5X CERTIFICATION OF LOAD LINES

1. Removal of hazardous items of environmental concern (i.e., mercury switches and PCB ballast), glass panes and fixtures as required to enhance safety.
2. The location of all floor/sewer drains will be verified and noted to facilitate their location after thermal treatment of the buildings.
3. Explosive process pipes in EBs or PEBs will be flashed using detonation cord and shape charges prior to thermal treatment.
4. Process equipment and ventilation ducts with potential explosive contamination will be inspected, sampled, and if necessary, flashed with detonation cord or pressure washed prior to thermal treatment of the building.
5. Every building within each load line will be loaded with dunnage to ensure a complete burn of explosive contamination.

## CAAP-001/002

### LOAD LINES 1-5 (OU4) (CONT.)

6. Fire breaks will be cut around each load line prior to initiating the burn to mitigate the potential for fire migration.
7. Heat sensing devices will be strategically placed in and around the load line buildings being burned to document complete decomposition of explosives.
8. After load line buildings have been burned, the walls and debris will be removed using armored excavators, front-end loaders and dump trucks, hardened with lexan blast shielding added to window surfaces.
9. After surface debris has been removed, floor drains will be relocated and flashed using detonation cord to enhance safety during concrete floor removal operations.
10. Hardened Earth Moving Machinery will be used to chip/demolish all concrete floors within EBs and PEBs, and the soil underneath will be checked for the presence of explosive soils (>10% by weight).
11. Any noticeable crack in the concrete floor (1/8" wide or greater) will require that the crack be flooded with water prior to the concrete flooring being demolished within three feet on either side of the cracked area.
12. Once floor removal has been conducted any visible explosive contamination under the floor will be remediated until an explosive concentration in the soil of less than 10% by weight is achieved.
13. Sampling of soil under floor slabs in NEBs, EBs and PEBs will be conducted to ensure and document that the soil is not explosive, i.e. <10%
14. Removal of all sewer piping within the Load Lines.
15. Environmental site characterization:
  - A. perform chemical characterization for contaminants of concern
  - B. identify locations and quantities where explosives-contaminated soils exceed industrial risk levels.
  - C. excavate and transport/disposal to local landfill.
  - D. backfill, compact, finish and grade.

## **ER,A ELIGIBLE ACTIVE AEDB-R SITES**

### **OU5**

Operable Unit Five (OU5) consists of one site, CAAP-005 Demo and Burning Ground. The Burning Ground was designated as OU3 in the feasibility study. Due to safety issues posed by DMM (explosives, lead azide, gravel mines, etc.), the site was removed from OU3 and redesignated as OU5.



**DEMO AND BURNING GROUND (OU5) (PAGE 1 OF 2)****SITE DESCRIPTION**

The Burning Ground is located in the northwest corner of the installation and covers an area of approximately 32 acres. The area is presently not in use and is covered by natural grassland vegetation. A portion of the site contains DMM from past fail-detonation attempts. This tee-shaped area is fenced and labeled "Restricted Area." Regions adjacent to the site are leased and cultivated for crops. The Burning Ground has been used since the early history of CHAAP for the burning, demolition and disposal of a variety of materials including 2,4,6-TNT, RDX, tritonal, aluminum powder, ammonium nitrate, and lead azide. The occurrence of a series of trenches is indicated on past aerial photos and has been confirmed by preliminary results of recent geophysical investigations by ICF Kaiser in 1991. In December 1967, several attempts were made to detonate canisters and drums filled with mines and mixed explosive waste. Several of these detonations resulted in scattering of explosive debris throughout the area. In April 1968, the demolition area was soaked with oil and ignited, and subsequently compacted using a tractor and roller. An area south of the restricted area was also historically used for burning explosive waste material.

During the excavation and incineration program (spring 88-90), construction materials from the contaminated surface impoundments and materials used in the incineration process were thermally treated at the Burning Ground. Approximately 5,549 cubic yards of explosives-contaminated soil were excavated from the earthen surfaces of the burning pads in association with closure of the site following the thermal treatment operations.

Phase I RI (1990): Burning Ground area contains five sites with 2,4,6-TNT levels exceeding the 5 µg/g level. Groundwater results indicate the presence of an anomaly associated with Freon. The Freon levels range up to 30,000 µg/L and has declined to 3,100 µg/L.

Phase II RI (1994-1995): Explosives were not detected above 2 µg/L. Freon concentrations in groundwater increased across the site and ranged from 36 µg/L to 3,000 µg/L. The risk was associated with these compounds. Within the restricted zone, explosive concentrations in soil were elevated. 2,4,6-TNT ranged up to 5,000 µg/g, 1,3,5-TNB from 5 to 15 µg/g and RDX remained below the industrial RBCS. The ABA is also

**STATUS****REGULATORY DRIVER:**

CERCLA, Federal Facility Agreement (NPL Installations)

**RRSE:** Medium

**CONTAMINANTS OF CONCERN:**

Explosives, VOCs, Metals

**MEDIA OF CONCERN:** Soil, Groundwater

<b>Phases</b>	<b>Start</b>	<b>End</b>
PA .....	197904 .....	198003
SI .....	197904 .....	199106
IRA .....	198604 .....	200009
LTM .....	200410 .....	200609

**RC: 200408**

## DEMO AND BURNING GROUND (OU5) (PAGE 1 OF 2)

part of this area and no contamination was found on this site. The site has been proposed for No Further Action.

Phase III RI (1998): HQ, OSC initiated visual DMM surficial inspections. Surface removal of vegetative growth was accomplished by controlled burning which resulted in a secondary detonation. HQ, OSC has performed preliminary site investigation by Ferex Imaging and partial clearance to the trench containing approximately 100,000 pounds of gravel mines in the original containers. Gravel mines were found scattered along adjacent grids at various depths and continue to pose a hazard to public transfer and sale.

May 2004: ER,A responsibilities transferred to MMRP for RI, MEC/OE removal, IRA, FS, PP, and ROD. LTM was performed to monitor release of potential contaminants of concern during DMM removal activities.

### CLEANUP STRATEGY

MMRP will perform a combined site characterization/MEC/OE removal, IRA, FS, PP and ROD.

## IRP No Further Action Sites Summary

AEDB-R#	AEDB-R Title	Documentation/Reason for NFA	NFA Date
CAAP-001A	PINK WATER DISP DP-01 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199603
CAAP-001AA	PINK WATER DISP DP-27 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199603
CAAP-001AB	PINK WATER DISP DP-28 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199603
CAAP-001AC	PINK WATER DISP DP-29 (CP)(OU4)	Study Completed. No Cleanup Required. ROD signed by EPA 200002	199801
CAAP-001AD	PINK WATER DISP DP-30 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AE	PINK WATER DISP DP-31 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AF	PINK WATER DISP DP-32 (CP)(OU4)	Study Completed. No Cleanup Required. ROD signed by EPA 200002	199801
CAAP-001AG	PINK WATER DISP DP-33 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AH	PINK WATER DISP DP-34 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AI	PINK WATER DISP DP-35 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AJ	PINK WATER DISP DP-36 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AK	PINK WATER DISP DP-37 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AL	PINK WATER DISP DP-38 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503

## IRP No Further Action Sites Summary (cont.)

AEDB-R#	AEDB-R Title	Documentation/Reason for NFA	NFA Date
CAAP-001AM	PINK WATER DISP DP-39 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AN	PINK WATER DISP DP-40 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AO	PINK WATER DISP DP-41 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AP	PINK WATER DISP DP-42 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AQ	PINK WATER DISP DP-43 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199512
CAAP-001AR	PINK WATER DISP DP-44 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AS	PINK WATER DISP DP-45 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AT	PINK WATER DISP DP-46 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001AU	PINK WATER DISP DP-47 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199502
CAAP-001AV	PINK WATER DISP DP-48 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001B	PINK WATER DISP DP-02 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001C	PINK WATER DISP DP-03 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503

## IRP No Further Action Sites Summary (cont.)

AEDB-R#	AEDB-R Title	Documentation/Reason for NFA	NFA Date
CAAP-001D	L LINE 4 PINK WATER DISP DP-04 (LP)(OU4)	Study Completed. No Cleanup Required. ROD signed by EPA 200002	199801
CAAP-001E	L LINE 5 PINK WATER DISP DP-05 (LP)(OU4)	Study Completed. No Cleanup Required. ROD signed by EPA 200002	199801
CAAP-001F	PINK WATER DISP DP-06 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001G	PINK WATER DISP DP-07 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001H	PINK WATER DISP DP-08 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001I	PINK WATER DISP DP-09 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001J	PINK WATER DISP DP-10 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001K	PINK WATER DISP DP-11 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001L	PINK WATER DISP DP-12 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001M	PINK WATER DISP DP-13 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001N	PINK WATER DISP DP-14 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001O	PINK WATER DISP DP-15 (LP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001P	PINK WATER DISP DP-16 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503

## IRP No Further Action Sites Summary (cont.)

AEDB-R#	AEDB-R Title	Documentation/Reason for NFA	NFA Date
CAAP-001Q	PINK WATER DISP DP-17 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001R	PINK WATER DISP DP-18 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001S	PINK WATER DISP DP-19 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001T	PINK WATER DISP DP-20 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001U	PINK WATER DISP DP-21 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001V	PINK WATER DISP DP-22 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001W	PINK WATER DISP DP-23 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001X	PINK WATER DISP DP-24 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001Y	PINK WATER DISP DP-25 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-001Z	PINK WATER DISP DP-26 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-002A	L LINE 1 PINK WATER DISP DP-49 (CP)(OU4)	Study Completed. No Cleanup Required. ROD signed by EPA 200002	199801
CAAP-002B	PINK WATER DISP DP-50 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503

## IRP No Further Action Sites Summary (cont.)

AEDB-R#	AEDB-R Title	Documentation/Reason for NFA	NFA Date
CAAP-002C	PINK WATER DISP DP-51 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-002D	PINK WATER DISP DP-52 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-002E	PINK WATER DISP DP-53 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-002F	PINK WATER DISP DP-54 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-002G	PINK WATER DISP DP-55 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-002H	LAUNDRY FAC PINK WATER DISP DP-56 (OU4)	Study Completed. No Cleanup Required. ROD signed by EPA 200002	199801
CAAP-002I	PINK WATER DISP DP-57 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-002J	PINK WATER DISP DP-58 (CP)	Study Completed. No Cleanup Required. ROD signed by EPA 200109	199503
CAAP-004	CLAY PIT DISPOSAL AREA (OU3-4)	All Required Cleanup Completed. ROD signed by EPA 200109	200106
CAAP-05	DEMO AND BURNING GROUND (OU5)	ER,A responsibilities transferred to MMRP for RI, MEC/OE removal, IRA, FS, PP, and ROD.	200408
CAAP-006	SWWTP (OU2)	Study Completed. No Cleanup Required. ROD signed by EPA 199809	199809
CAAP-007	CISD SANITARY WWTF (OU2)	Study Completed. No Cleanup Required. ROD signed by EPA 199809	199809
CAAP-009	UNDERGROUND STORAGE TANKS (INSTALL WIDE)	ROD signed by EPA 200002	200403



***Initiation of IRP:*** 1980

### ***Past Phase Completion Milestones***

#### **1980**

- PA/SI Initiation

#### **1982**

- PA/SI Completion

#### **1984-86**

- IRA Load Line soils

#### **1986-94**

- Interim RA extended water line

#### **1992**

- Site Characterization Document

#### **1994**

- Interim ROD OU1 Groundwater
- IRA Hotspot soils (94-95)

#### **1996**

- RI OU1, 2 & 3
- RD groundwater treatment plant

#### **1997**

- PRI Addendum OU2
- PP OU2

#### **1998**

- ROD OU2
- Interim RA groundwater treatment OU1

#### **1999**

- UXO Safety action for OU5 by OSC
- ROD OU3, Signed in December

#### **2000**

- ROD OU4
- RA Soils completed (OU3)

#### **2001**

- Amend OU1 ROD



### 2002

- CAAP transfer from OSC to USACE 5 year CERCLA review started

### 2003

- RA soils completed OU3 AST
- DMM Safety action completed for Load Line 5 and Load Line 1

### 2004

- DMM safety action completed Load Line 2 & 3
- 5 year CERCLA review released to the Public.
- Remove CAAP-05 and transfer to MMRP program.

### 2005

- DMM safety action completed Load Line 3

### 2006

- DMM safety action completed Load Line 4

### 2007

- Load Line 1, 2 and 3 LTM complete with 5X certification for public transfer
- ESS for OU3 sites (4) for NFA approval by DDESB for public transfer
- Freon SI and ESS for NFA completed/approved by DDESB for Tract 21 OB/OD area for public transfer
- Load Line 4 LTM completed for public transfer

***Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates:***  
Unknown

***Projected Construction Completion Date of IRP:*** 2009

***Projected Date for Removal from NPL:*** 2012

***Schedule for Next Five-Year Review:*** 2007

***Estimated Completion Date of IRP (including LTM phase):*** 2027

# Cornhusker AAP IRP Schedule

(Based on current funding constraints)

AEDB-R #	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
CAAP-003	LTM									
CAAP-008	LTM									202310
CAAP-010	RA(O)									201712

*Prior Years Funds (may be listed by project instead of site)*

**Funding up to FY04: \$51,462K**

Year	Site Information	Expenditures	FY Total
<b>FY05</b>	LTM CAAP-003	3,523K	
	RA(O) CAAP-010	1,097K	<b>4,620K</b>
<b>Total Funding up to FY05: \$56,082K</b>			

*Current Year Requirements*

Year	Site Information	Expenditures	FY Total
<b>FY06</b>		\$2,886K	<b>\$2,886K</b>
<b>Total Funding FY06: \$2,886K</b>			

**Total Future Requirements: \$18,735**

**Total IR Program Cost (from inception to completion of the IRP): \$77,703K**

# CORNHUSKER ARMY AMMUNITION PLANT

## Military Munitions Response Program

**Total AEDB-R MMRP Sites/AEDB-R sites with Response Complete:** 1/0

**AEDB-R Site Types**

1 Open Burn Site

**Most Widespread Contaminants of Concern:** Explosives, Gravel Mines, MC and Metals

**Media of Concern:** Soil, Groundwater

**Completed REM/IRA/RA:** None

**Total MMRP Funding**

Prior years (up to FY05):	\$ 44K
Current Year (FY06):	\$ 200K
Future Requirements (FY07+):	<u>\$8,293K</u>
Total:	\$8,537K

**Duration of MMRP**

Year of MMRP Inception: 2002

Year of MMRP RC: 2013

Year of MMRP Completion Including LTM: 2013

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## MMRP Contamination Assessment

### ***MMRP Contamination Assessment Overview***

The Phase 3 Army Range Inventory was completed at Cornhusker AAP in May 2003 and identified one site as eligible for the MMRP. The Phase 3 inventory serves as a PA under CERCLA. A SI was initiated in October 2004.

### ***MMRP Cleanup Exit Strategy***

The installation plans to complete the SI in October 2006 and execute follow-on phases/actions as required in the individual site cleanup strategies. Perform MEC/OE to include RI/FS to ROD for clean transfer/sale.

### 2003

- US Army Closed Transferring and Transferred Range/Site Inventory for Cornhusker Army Ammunition Plant, Nebraska, engineering-environmental Management, Inc., October 2003.

### 2005

- Military Munitions Response Program (MMRP) Limited Site Inspection, Cornhusker Army Ammunition Plant, Grand Island Nebraska, engineering-environmental Management, Inc., March

### 2006

- Draft Military Munitions Response Program Site Inspection for Cornhusker Army Ammunition Plant, Nebraska, engineering-environmental Management, Inc., April

# CORNHUSKER ARMY AMMUNITION PLANT

## Military Munitions Response Program Site Description



**DEMOLITION AND BURNING GROUNDS (PAGE 1 OF 2)****SITE DESCRIPTION**

The Demolition and Burning Ground (CHAAP-0050R-01) is located in the northwest corner of the installation (Track 19) and covers an area of approximately 26 acres. The Demolition and Burning Ground is surrounded by chain link fence (Restricted Zone) and a locked gate. A small area, known as IRA Site 1, is located to the west and outside of the Restricted Zone fence. The Exclusion Zone area consisted of a "T" shaped area (with a separate fence) inside the Restricted Zone. Inside the Exclusion Zone were the remains of 2 Burning Pads used for detonation and burning explosives. Other areas within the Restricted Zone include:

Drainage Ditch Area: stressed vegetation area (100 ft. x 300 ft.) near the northeast corner of the Demolition and Burning Grounds.

Metal Flashing Area; used to burn explosives-contaminated machinery, equipment, scrap metal, pipe, and bomb casings.

Ammonium Nitrate/Aluminum Powder Burning Area; this area may have extended 100-200 feet west (outside) of the Restricted Zone.

Dispersion Area; Residue from explosives burning in the Demolition and Burning Grounds were collected and tested, and if the material was certified to contain less than 1 percent residue, it was dispersed in this area.

Types of MEC, DMM, and MC observed in the Demolition and Burning Ground include aluminum munitions scrap, fuze components Type 404A1, plastic explosive waste, micro-gravel mines, and other MEC, as well as significant amounts of munitions constituents (tritonals and lead azide).

Previous investigations were completed from 1991 through 2000. These investigations included an Environmental Assessment (1991), Site Conceptual Design Study (1993) and a Remedial Investigation (1995). The investigations included the collection of surface and subsurface soil and groundwater samples. Geophysical surveys (EM and GPR) were also completed as part of the 1991 Environmental Assessment and 1993 Site Conceptual Design Study to help screen the area for contamination.

In 1967, several attempts were made to detonate canisters and drums filled with micro-gravel mines within the southern part of the Exclusion Zone. Apparently, these canisters

**STATUS**

**REGULATORY DRIVER:** CERCLA

**RAC SCORE:** Low Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Gravel Mines, MC, Metals

**MEDIA OF CONCERN:** Soil, Groundwater

Phases	Start	End
PA .....	200201 .....	200305
SI .....	200410 .....	200610
RI/FS .....	200607 .....	201304
IRA .....	200607 .....	201204

**RC: 201304**

**DEMOLITION AND BURNING GROUNDS (PAGE 2 OF 2)**

were filled with Freon 113 to desensitize the lead azide contained in the micro-gravel mines. Any scattered debris from these failed detonation attempts was saturated with Freon 113, transported back to the burning pads, and re-detonated. As a result of this activity, groundwater in the area contains Freon, but below the clean-up criteria. Groundwater sampling at several monitoring wells in the area was initiated in 2000 to monitor for Freon.

In 1994, an Interim Removal Action (IRA) was completed which included the excavation of explosives in soil within the IRA Site 1.

A munitions response was performed by the Army Industrial Operations Command from 1999 to 2002. 100 ft. x 100 ft. grids were surveyed within the Exclusion Zone and remote excavation and sifting was used to clear the grids of munitions. Several of the grids were only cleared by locating anomalies and excavating those anomalies only, while other grids were excavated entirely to 4 feet.

In 2002, under the Military Munitions Response Program (MMRP), a Site Inventory was completed for the Cornhusker Army Ammunition Plant and identified the Demolition and Burning Grounds as a Munitions Response Site (MRS).

In May 2004, ER,A responsibilities for IRP CAAP-005 transferred to MMRP (now CHAAP-0050R-01).

In March 2005, limited soil samples were collected at the MRS as part of the Site Inspection (SI) phase within the MMRP. A draft SI Report was issued in April 2006. The SI Report is expected to be finalized in October 2006 and recommend further investigation and action to address the MEC, DMM, and MC at the Site.

**CLEANUP STRATEGY**

The Central Platte Natural Resource District (CPNRD) has acquired adjoining tracks of land from the Army and is interested in Track 19C. The CPNRD is currently completing a final design for a Flood Control Project within the area. Prior to their acquisition of Track 19C, the CPNRD has required the Site be clear of MEC in order to construct a storm detention cell. Removal of the MEC, DMM, and MC through a IRA will be conducted concurrently with the RI/FS. The IRA will consist of remote excavation and sifting to a depth of undisturbed soil. No additional groundwater work is proposed for the Site. An EE/CA and Action Memorandum will be prepared prior to the IRA. A RI/FS and ROD will be prepared after the completion of the IRA. A no further action ROD is anticipated for the Site.

***Initiation of MMRP:*** 2002

***Past Phase Completion Milestones***

**2003**

- PA, CHAAP-001-R-01, May

***Projected ROD/DD Approval Dates:*** 201304

***Projected Construction Completion:*** None

***Schedule for Five Year Reviews:*** None

***Estimated Completion Date of MMRP including LTM:*** 201304

## Cornhusker AAP MMRP Schedule

(Based on current funding constraints)

AEDB-R #	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
CHAAP-005-R-01	RI/FS									
	IRA									

## MMRP Costs

### *Prior Years Funds*

**Funds up to FY04: \$0K**

Year	Site Information
------	------------------

FY05	SI (all sites)
------	----------------

Expenditures
--------------

\$44K
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FY Total
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\$44K
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**Total Funding up to FY05: \$44K**

### *Current Year Requirements*

Year	Site Information
------	------------------

FY06	SI (all sites)
------	----------------

Expenditures
--------------

\$200K
--------

FY Total
----------

\$200K
--------

**Total Funding FY06: \$200K**

**Total Future Requirements: \$8,293K**

**Total MMR Program Cost (from inception to completion of the MMRP): \$8,537K**

HQ, IOC and the US Army Environmental Center conducted community interviews in the spring of 1995 to determine interest in a RAB. The initial RAB orientation session was held at Grand Island City Hall, 19 April 1995. News releases were printed in the paper and announced on TV and radio. Fact sheets were printed and distributed in the community.

A public meeting was held for comment concerning OU1 ROD Amendment in September 2001. No citizens attended. Less than a dozen citizens attended the initial meeting with an equal number of government personnel on hand. Many of the citizens were interested in contracts and doing business with the Army.

Follow on RAB meetings in 1998 and 1997 resulted in poor attendance (as few as three citizens) with very little media interest.

The installation (CHAAP) does not plan on pursuing a RAB, due to limited local interest. The Technical Review Committee (TRC) was discontinued due to lack of public attendance at meetings.

There will be public availability sessions for the remaining FS, PP, and ROD signing. Public affairs statements are issued after significant events. Public notice of annual LTM sampling dates and results are issued by the news media.

CHAAP, regulators and advisory members of Reuse Committee work together on decisions; the public has given their representation to the CPNRD for groundwater issues. Public notification of CHAAP transfer to USACE.

Explosive safety actions: Media Day

- a. Preflash of Load Line 1, 2 and 3; tour of a Load Line
- b. Controlled burn and controlled media access
- c. Follow-up